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ago part of the uninhabitable polar regions, may become settled in course of time, as it possesses considerable natural resources. The great length of navigable rivers facilitates communication. The extent of continuous lake coast and river navigation is estimated at 6,500 miles, broken only in two places there situated upon the Great Slave and Athabasca Rivers. It is stated that there is a pastoral area of 860,000 square miles, arable lands to the extent of 274,000 square miles, while 400,000 square miles are considered useless for cultivation and stock-raising. The climate of this region is described as more favorable, as is generally assumed, and comparable in certain districts to that of western Ontario. It appears that there is an abundance of fish, and an ample supply of wood suitable for building-purposes. Among the mineral products, special attention is called to the extensive auriferous area and to the large petroleum-fields. The energetic attempts of Canada to develop the resources of the country have led to an increase of immigration to their western provinces. Undoubtedly the present inquiry will help to direct attention to the resources of those remote regions.

#### ECONOMY OF FOOD.

IN February we sent out from the office of *Science* a circular letter to a number of physicians, political-economists, and others likely to be posted and interested in the economy of food. In this letter we called attention to Prof. W. O. Atwater's article on the subject in the *Century* for January, and stated that it is generally believed that even those who wish and try to economize in the purchase and use of food very often do not understand how, and that while they consult carefully the prices they pay, and judge from these the nutritive value of the articles, they are frequently misled.

Our questions sought for information as to the existence of a considerable tendency among people of moderate means to bad economy in the following respects: first, in the purchase of food either of needlessly expensive kinds or ill-balanced quantities; second, in the cooking of food; third, in the actual waste of food, that is, the throwing-away of nutritious material instead of consuming it economically; finally we asked for suggestions as to such means as might be deemed appropriate for correcting any of these forms of bad economy that might exist.

Responses were received from various portions of the country; and while the evidence was generally to the effect that there did exist a considerable tendency among people of moderate means to bad economy, there were several noteworthy opinions to the contrary.

Mr. P. H. Felker, editor of the *St. Louis Grocer*, stated that he has had an experience in the retail grocery trade, and does not think that people of moderate means exhibit bad economy, as a rule, in the purchase of expensive kinds of food. Nor does he believe that much is thrown away by poor people. His experience is, that those who pay for what they buy do not waste, but that those who do not intend to pay, but expect the world to give them a living, are careless and wasteful.

Charles N. Chapin of Providence, R.I., is another of the dissenters. He believes that there can be little question that there is a tendency to purchase needlessly expensive qualities of all kinds of food, but he is certain that there is not nearly as much extravagance absolutely among such persons as there is among the rich or even well-to-do, and he doubts very much whether there is relatively as much. According to his experience, day-laborers, workers in mills and factories, and the poorer class of mechanics, do not as a rule purchase as fine a quality of meat and groceries as do those in better circumstances. There is a large grocery in his city whose patrons are chiefly well-to-do or rich, and this grocery has never taken out an 'oleo' license; while in the stores in the poorer parts of the same city, and in the manufacturing villages, oleo is sold in large quantities, sometimes almost to the exclusion of butter. The dealer in choice groceries informs him that he sells five barrels of Haxall flour to one of St. Louis, while in the mill villages the proportion is two to one in favor of St. Louis. A butcher having some of the best trade in Providence, and also having a

store in a neighboring manufacturing village, states that he sold cheaper and leaner meat in the village than in the city, yet this same man says that some of his most extravagant customers in the city were among the poor. As at this point Mr. Chapin makes an important suggestion, we quote his words: "And just here, it seems to me, is the place where an error has crept into Professor Atwater's article, and also into the report of the Massachusetts Labor Bureau. In the case above mentioned the majority of the persons who bought at the city store were rich, and those who were not were chiefly coachmen, washerwomen, janitors, and persons who were objects of charity; in other words, those who were brought into comparatively close contact with the rich, and who hence aped their manners and tastes. Such people are often the most extravagant in the world. I think it will be found that it is chiefly in neighborhoods or in stores where the rich and poor purchase together that an inordinate extravagance will be found on the part of the poor. I am positive that in our manufacturing villages and in the manufacturing sections of this city, the working-people, while requiring good food, do not consume such a high grade of goods as do those in better circumstances." In regard to the actual waste, — non-consumption of foods purchased, — Mr. Chapin holds that all evidence goes to show that the poor are much more economical than the well-to-do or the rich. In Providence the swill-contractor gets the same amount of swill from less than six thousand persons in the wealthy part of the city as he does from over twelve thousand persons in a manufacturing district; and the swill in the former case contains a large amount of nutritive material, while in the latter case it consists chiefly of bones, codfish-skins, parings from boiled potatoes, etc. Mr. Chapin believes that the use of novel or artificial articles of food, such as canned goods, oleo, glucose, cottonseed-oil, baking-powders, etc., tends to make living cheaper, while these foods are in many cases just as palatable as the more expensive. Mr. Chapin finally suggests that it is, after all, a question whether any but a very few, the very poor, need to practise much greater economy than they do. While it is true that the neck is as nutritious as a sirloin steak, it is equally true that the latter is more palatable. A man would be comfortable in patched clothes and a room with whitewashed walls and a bare floor, yet we do not consider it a sin or even unwise for the majority of even wage-earners to make their surroundings agreeable.

Mr. David Murray of the University of the State of New York has serious doubts whether the prejudice which Professor Atwater speaks of, against the purchase of cheap food, exists to any very considerable extent.

We have also to class among the doubters of the waste of food Mrs. M. Fay Peirce, New York, author of 'Co-operative House-keeping.'

Mrs. Fay's experience is, "that Americans, especially men, crave meat three times a day; and if they can get it, they have it. No doubt," she says, "they could do with meat once a day, and make up in milk and eggs. The fact remains the same, that the human system prefers a great deal of meat; and may not the enormous energy and enterprise of the American people, and the large average of mental work which as a nation Americans accomplish, be in great measure due to the national indulgence in meat? In answer to the first question, I should therefore hesitate to say that too much meat is purchased by our people. Second, Roast meat and broiled meat are, of course, infinitely more enjoyable than boiled and stewed meats. No matter how exquisitely flavored the *ragouts*, the appetite will tire of them; but of beefsteak and mutton-chops broiled, or of roast beef and roast mutton, etc., people never tire. You cannot, however, roast or broil cheap and tough meat: hence Americans buy the roasting and broiling pieces. If they liked a savory stew as well, of course they would save their money and buy it. The simple fact is, that no art of the cook can equal the flavors of nature. Roast and broiled meat is meat *au naturel*, and, as long as the poor man can pay for it, he may be expected to indulge in it. Moreover, no doubt such meat is far more exhilarating and nourishing than boiled and stewed meats. Third, I do not believe that poor people throw away any thing they can eat. I believe that every thing they buy is eaten except the bones and the potato and squash parings; and, in general, the women who do their own

cooking probably waste little if any thing. It is with the servant-keeping class that waste begins. Every servant throws away that which her mistress would save were she doing her own cooking; and the higher up in the social scale we go, the more expensive and varied the table, the more frightful is the waste. Of course, nothing can stop this but the constant supervision of the house-mistress in precisely the way that the careful German *haus-frau*, and the French middle-class woman or *bourgeoise*, keep a dragon watch over their respective cooks; and it is to be doubted whether this will ever be the case with us while American men make money so easily, and are so generous with it as hitherto. It is, of course, a perpetual slavery to the house-mistress — a tying-down to three meal-times a day — when the servant must be superintended and watched; for this must go on not only while she is preparing the food, but also while she is clearing the remnants of it away. Fourth, I have given what I consider the one and only solution, and a perfectly comprehensive one, of all the waste of contemporary housekeeping, as well as of its innumerable imperfections and shortcomings, in the theory of 'Co-operative Housekeeping.' If housekeepers never combine to keep house, i.e., to make homes in the best and cheapest manner possible, house-keeping and home-making never will and never can become to every member of the civilized human family what it can and ought to be. Meantime perhaps the best thing that could be done for the poor would be to insist on every girl of twelve or fourteen years of age who leaves the grammar-schools, learning how to make a savory stew out of cheap meat, and also how to make thick soups (what the French call *purée*) out of dried pease and beans, and also out of potatoes, onions, celery, spinach, etc. I know that poor women constantly wash and sew for a living, and bring up their children on tea and bread chiefly. Of course these are cheaper at the moment, and easier, than even a cheap meat-stew; for cheap tea is certainly a very cheap way of getting motive power to work, probably the cheapest there is. But if poor women knew how to make a cheap stew that is really appetizing and satisfying, perhaps they would more often do it."

Prof. J. B. Clark of Northampton, Mass., agrees that the poor, in common with other classes, depart from the rule of a maximum of nutriment for a given sum; but the departure is, in his opinion, rather beneficial than otherwise. If any class in America above the very lowest were to consume as much food as they now do, and were to select the kinds that offer the largest amount of nutriment for the money, they would suffer from the worst physiological effects of over-eating. There is, however, a general habit of consuming too much sugar for either health or economy, and of using unnecessarily expensive grades of flour and meat.

Prof. Edward W. Bemis of Vanderbilt University, Nashville, Tenn., agrees with Professor Atwater as to the great wastefulness almost everywhere prevalent in this country, but to the list of reasons assigned by him, would add another as also operative in considerable measure in the case of the average wage-earner. As he writes, "it is generally believed by the latter that wages tend to fall toward the customary cost of living, to that point which will sustain a given class of workers in their usual comforts; and that, in consequence of this, any denial of one's taste which is involved in the use of the cheaper and more nutritious, but even, according to Professor Atwater, less palatable foods, will only result in the end, if generally adopted, in lower wages. To establish this dependence of wages on average expenditures is the sole aim of George Gunton's recent book, 'Wealth and Progress.' At one time the reasoning on which the above book and the general belief of our workingmen are founded seemed conclusive to the writer, and the presentation of the argument, as it then appeared to me, drew out, in private conversation with a prominent writer and advocate of Professor Atwater's views, the candid admission that 'perhaps, after all, the great benefit of this more scientific choice and preparation of food will consist in prevention of dyspepsia,' — one of the few ailments from which the poor are comparatively free. He was right, provided the theory of wages just quoted — which, be it noted, is quite a modification of the so-called 'iron law' — is correct. This I do not believe; that is, it seems to be true only with this important change, — that wages tend to fall to that point which will maintain the workman in his usual comfort, and permit

of his usual savings; the latter, it is true, being now small or non-existent, and both the standard of comfort and savings being subject to fall in times of long-continued industrial depression or cut-throat competition from the unemployed or from immigrants used to a lower standard of living, but also (and this is most important) being subjected to great and general increase with education and enlargement of social wants. Money saved by the use of cheaper and equally nutritious food may be invested in banks and co-operative building and loan associations, called in Massachusetts 'co-operative banks,' and wages be still maintained at the old rates: for the money saved will become the capital of its borrowers, and thus increase competition for labor. This is no place for a full discussion of the subject, though one's theory of wages is the perhaps unconscious basis of nearly all discussion of economy of food as applied to the elevation of the masses, in which aspect Professor Atwater's ideas attain their widest importance. If wages may be kept as much above one's standard of living, after allowing for the rewards of the capitalist and employer, as the general thrift, intelligence, and power of combination of the workmen may secure, and not necessarily fall with the use of less expensive and equally nutritious diet (as most wage-earners, both in and out of the unions, believe), then the present widespread and natural objection of the masses to the views of Professor Atwater will be fully met." Professor Bemis therefore urges, first, a far deeper study of the theories of wages, and a far wider dissemination of correct views on the subject among the masses, as a necessary preliminary to instruction upon the direct question of food-supply.

The opinion of the majority of the replies is well given by Mr. F. E. Manson of the *Kennebec Journal*, Augusta, Me., who writes, "I have observed, even among the employees of our own establishment, the tendency to bad economy, especially in early spring, when food-articles first coming upon the market are sold at outrageous prices. Again: the purchases made the year through at the provision-stores show the tendency toward luxury instead of healthful and strength-giving food. There is no doubt in my mind that there is a vast diminution of the real fuel-properties of food in the way it is cooked by the very people who most need its every strength-giving property. One has simply to sit down at a table to evidence this. There is here a cause of the very condition ('of moderate means') of our people. To make the most of food-articles is yet a lesson to be learned. Generally among our people an article of food once cooked is considered done. The parts not eaten are wasted; whereas if the parts had been separated before cooking, and cooked in different ways, or separated after cooking and re-served in a different form, all the nutritious properties would have been consumed, and economy practised."

In reply to one inquiry, Gen. F. A. Walker of Boston writes, "Among people of moderate means in the United States there unquestionably is great waste, resulting alike from indifference and from ignorance; but among the very poor the waste is simply hideous. Cheated often in quantity, quality, and price at the retail stores, the great majority of the women of the poorest class, who are generally foreigners, are altogether incapable of managing what they get for their scanty incomes, with true economy. They lose in storing their supplies, in cooking them, in serving them. Even this is not so bad as the injury done to health and to personal habits (through the promotion of intemperance) by frying food, by the use of saleratus, and by the bad management of fires during the process of cooking. Much can be done by the intelligent and benevolent to promote a better economy of the small means of the very poor, through lectures, newspaper paragraphs, and house-visiting. But it is with the cooking-school that the hope of a better generation of housekeepers and domestic cooks chiefly lies. The economy of food and materials here secured is quite as remarkable as the superiority of results in wholesome, cleanly, appetizing food. On the former point let me cite a single instance. At the Tennyson Street School, in Boston, the amount of coal consumed during the first nine weeks of the present school-year, in keeping the range ready to cook, from half-past nine to four o'clock each day, five days in the week, was only one-quarter of a ton. No one can visit the school to which I have referred without being impressed by the truly and highly educational character of the teaching given, as well as by the immense practical value of what

